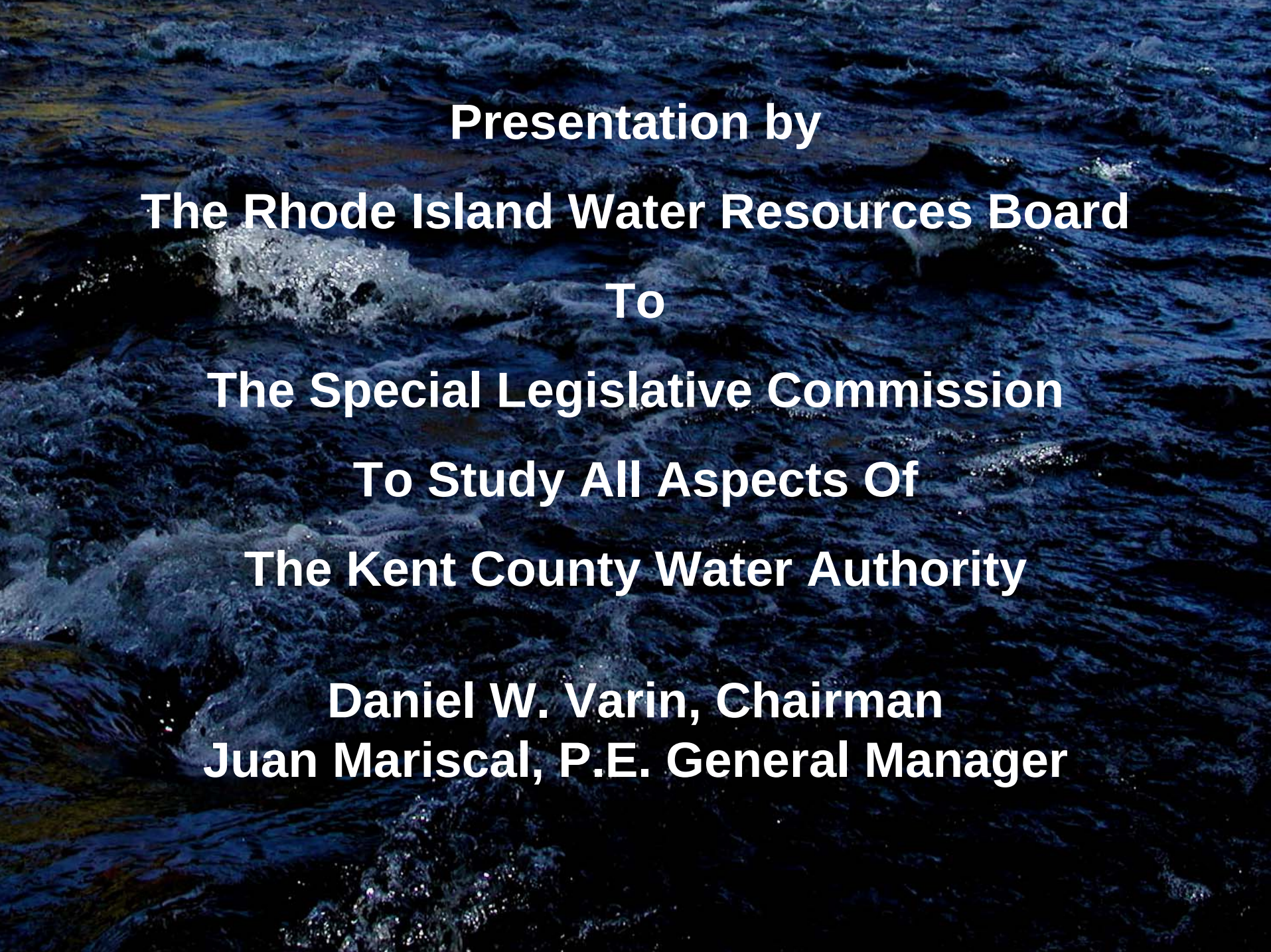

Presentation by
The Rhode Island Water Resources Board
To
The Special Legislative Commission
To Study All Aspects Of
The Kent County Water Authority
Daniel W. Varin, Chairman
Juan Mariscal, P.E. General Manager


WATER RESOURCES BOARD
STATE OF RHODE ISLAND
HOPE


Rhode Island
Water Resources Board
&
Water Resources Board
Corporate

Rhode Island Water Resources Board
Organizational Structure

- Executive Agency within State Government
- Established in 1967
- RIGL Chapter 46-15, 15.1, 15.2, 15.3, 15.6, 15.7
- 10 member Board
  - Five Public Members
    - Including two Water Suppliers
  - Agricultural Council
  - DEM, DOH, DOA
- 9 staff members

Rhode Island Water Resources Board
Legislative Authority

RIGL 46-15-1: Legislative Declaration

- (6) “It shall be the duty of the water resources board to regulate:
  - the proper development,
  - protection,
  - conservation and
  - use of the water resources of the state.”

Rhode Island Water Resources Board
Legislative Authority

RIGL 46-15.1-4: Purposes of the WRB

- To Establish Water Supply Facilities;
- To Lease those Facilities;
- To Contract for the Use of the Facilities; OR
- To Sell the Water from the Facilities and
- To carry out the power & duties set forth in this chapter

Rhode Island Water Resources Board Corporate
Legislative Declaration

RIGL 46-15-1-1: RIWRB Corporate:

- A Body Politic and Corporate
- A Public Instrumentality of the State
- Distinct Existence from the State
- Not an Agency of State Government

- Members of RIWRB-Corporate are the same as the RIWRB

Rhode Island Water Resources Board Corporate Legislative Authority

RIGL 46-15.1-4: Powers of WRBC

(3) To Purchase, Hold and Dispose of Real Estate:

(6) To Make Contracts:

(9) To Apply & Contract for assistance (and grants) from the United States and others:

(11) To invest & deposit funds:

(12) To Establish, Operate & Maintain or Lease to Others or to Contract with Others Water Supply Facilities:

(13) To Purchase and Sell Water

Continued ...

Rhode Island Water Resources Board & Corporate Legislative Authority

RIGL 46-15.1-4: Powers of RIWRB & RIWRBC

(15) To acquire the sites, lands, dams, waters, water rights, easements & other property … for reservoirs groundwater wells and land for pipes (and other related appurtenances)

(16) To contract or purchase reservoirs, wells and well sites facilities (etc.) including existing facilities of public or private water systems;

(17) To acquire assets and to effect the merger into itself of any corporations or other organization including public and private Systems

Rhode Island Water Resources Board & Corporate Legislative Authority

RIGL 46-15.1-19: Surface Reservoirs

- No funds may be used for the design or construction of any surface reservoirs without the approval of the general assembly
- The RIWRBC may not use its powers of eminent domain for the acquisition of sites for surface reservoirs without the approval of the general assembly

Rhode Island Water Resources Board & Corporate Legislative Authority

- **RIGL 46-15.2-4:**
- **Water Facilities Assistance Program**
  - **(a) “There is hereby established in the water resources board a Rhode Island water facilities assistance program.”**
  - **“…to assure proper and systematic development of coordinated water supply (facilities).**

Rhode Island Water Resources Board & Corporate Legislative Authority

- **RIGL 46-15.3-1.1: Findings**
  - **"To insure that water supply system management plans are prepared, maintained and carried out by each" water supply agency.**
  - **"Plans and their execution (shall) achieve effective and efficient conservation, development, utilization and protection of this finite natural resource."**

Rhode Island Water Resources Board
Legislative Declaration

RIGL 46-15.7

Management of the Withdrawal & Use of the Waters of the State

(4) The Water Resources Board is the state agency which manages the withdrawal and use of the waters of the state of Rhode Island


Rhode Island Water Resources Board
Key Projects

Rhode Island Water Resources Board

Key Projects

- **Water Supply System Management Plans**
- **Groundwater Protection Site Acquisition**
- **Supplemental Water Supply**
- **Water System Emergency Interconnections**
- **RI Public Drinking Water Protection Program (user fee surcharge program)**

Continued ...

Rhode Island Water Resources Board
Key Projects

- Bristol County Water Authority
  - –Water Treatment Facility Upgrade
  - –Shad Factory Pipeline Repair & Replacement
- Water Use and Availability Studies
- Big River Management Area
- Drought Management Planning
- Water Facilities Assistance
- Hydrologic Modeling Efforts


Rhode Island Water Resources Board
Water Supply Management Plans

Rhode Island Water Resources Board
Water Supply System Management Plans

- **Legal Authority: RIGL 46-15.3-1.1**
  - **"To insure that water supply system management plans are prepared, maintained and carried out by each" water supply agency.**
  - **"Plans and their execution (shall) achieve effective and efficient conservation, development, utilization and protection of this finite natural resource."**

Rhode Island Water Resources Board
Water Supply System Management Plans

- **Applicability**
  - Suppliers which sell >50,000,000 gallons/year
    - (>~136,900 gpd)
- **Submittals**
  - First plans submitted to RIWRB in 1997
  - Updates Required:
    - Major: Every Five Years
    - Interim Updates: Every 30 months
    - Annual Reports

Rhode Island Water Resources Board

Water Supply System Management Plans

- **Water Supply Plan Contents**
  - Executive Summary & Goal Statements
  - Description of the Water Supply System
  - Water Quality Protection Component
  - Mapping Requirements (District, Source)
  - Supply Management
  - Demand Management (Current, Future)

Continued ...

Rhode Island Water Resources Board
Water Supply System Management Plans

- **Water Supply Plan Contents** Continued
  - Emergency Management
  - Drought Management
  - Implementation Schedule
  - Financial Management
  - Coordination

Rhode Island Water Resources Board
Water Supply System Management Plans

- **Agency Review of Plans: The Process**
  - Plan Submitted to RI WRB
  - Reviewed By
    - Water Resources Board
    - Statewide Planning Program
    - Department of Health
    - Department of Environmental Management
    - Public Utilities Commission

Rhode Island Water Resources Board
Water Supply System Management Plans

- **Agency Review: The Process**
  - Review coordinated with
    - State Policies and Regulations
    - Local Comprehensive Plans
    - Affordable Housing Plans
    - Infrastructure Replacement Plans
    - Master Plans
    - Other Appropriate and Relevant Information, Data, Plans, etc.

Rhode Island Water Resources Board
Water Supply System Management Plans

- Agency Review: The Process
  - 180 Day Review Period
  - WRB forwards Plans to Review Agencies
    - 90 Days to Provide Comments to WRB
  - RI WRB coordinates all comments & completes review
  - Recommendation made to the WRB Board through the Public Drinking Water Protection Committee


Rhode Island Water Resources Board
Water Management System

Rhode Island Water Resources Board
Water Management Program

RIGL 46-15.7

Management of the Withdrawal & Use of the Waters of the State

(4) The Water Resources Board is the state agency which manages the withdrawal and use of the waters of the state of Rhode Island

Rhode Island Water Resources Board
Water Management Program

- **Water Allocation Program Advisory Committee Created in June 2002**
- **Interdisciplinary group (60 – 150 persons)**
  - **Public agencies: federal, state, local**
  - **Water Suppliers**
  - **Affected Users & Businesses**
  - **Community & Environmental Groups**
  - **Academics**

Rhode Island Water Resources Board
Water Management Program
WAPAC Mission

- **Develop Recommendations To:**
  - Manage ground and surface water withdrawals
  - Protect public health, safety & welfare
  - Provide fair and equitable allocation of water
  - Promote continued existence, diversity and health of wildlife and plants
  - Insure long-range considerations are paramount

Rhode Island Water Resources Board
Water Management Program
WAPAC Sub-Committees

Water Use Reporting	Fees & Rates
Integrated Water & Wastewater	Education, Outreach & Public Relations
Priority Uses	Streamflow
Water Rights/Regulatory Analysis	Impact Analysis
Out-Of-Basin Transfer	Joint Advocacy & Funding

Rhode Island Water Resources Board
Water Management Program
WAPAC Recommendations

- 84 Total Recommendations
- 21 Top Priority Recommendations
  - Data Elements
  - Management & Regulatory Elements
  - Financial & Funding Elements
  - Resource Conservation Elements
  - Education & Outreach Elements

Rhode Island Water Resources Board
Water Management Program
WAPAC Transition To RIWRB

- WAPAC Consensus Building Meetings
  - December 18, 2003 &
  - January, 2004
- WRB Strategic Planning Committee Workshop
  - January 29, 2004
  - Presentations by WAPAC Sub-Committee Chairs
- Adoption of Recommendations by RIWRB
  - February, 2004
  - April, 2004

RIWRB Water Management Program

Adopted Recommendations

- Priorities Water Use Policy
- Water Management Program (Watershed-Based)
- Water Use Reporting
  - Mandatory for Major Suppliers
  - Voluntary for Minor and Self Suppliers
- Streamflow Working Group
- Develop Collaborative Education Program
- 15-person Implementation Team

Rhode Island Water Resources Board

Big River Management Area


Rhode Island Water Resources Board
Big River Reservoir

Rhode Island Water Resources Board

Big River Reservoir: History

- **1928: Project Conception: Legislative Commission Report : *Water Resources of Rhode Island***
- **1952: Water Resources Commission Report: *Water Resources of Rhode Island***
- **1957: Water Resources Coordinating Board: *Feasibility of Development of Water Supply Reservoir***
- **1960: WRCB Report & Recommended Legislation : *Reservoir Sites for Future Water Supply*)**

Continued ...

REPORT

TO

HIS EXCELLENCY

CHRISTOPHER DEL SESTO

GOVERNOR OF RHODE ISLAND

Recommending

Legislation for the Acquisition of

RESERVOIR SITES

FOR

FUTURE WATER SUPPLY

STATE WATER RESOURCES

COORDINATING BOARD

FEBRUARY 1960

Rhode Island Water Resources Board

Big River Reservoir: History

- **1962: $5M GO Bond Referendum:**
  Big River Reservoir Land Acquisition
  Voters Rejected: 60% - 40%
- **1964: $5M GO Bond Referendum:**
  Big River Reservoir Land Acquisition
  Voters Approved: 58% - 42%

Continued ...

WHAT GOOD IS AN EMPTY GLASS?

Or a house, or an industrial plant, or a vegetable garden, or a fire hydrant, without water?

None whatever!

Water shortages happen here in Rhode Island. Water use in many communities had to be curtailed in the 1964 summer months. And water shortages will get worse until we do something about them.

Adequate water supply attracts industry—means more jobs. There's the future to plan for! Between 1950 and 1960 water consumption for the five principal Rhode Island systems rose 15%. It will continue to climb as population and industry grow.

Today we have around 860,000 people in Rhode Island. Experts predict that by 1980 the figure will be between 1,050,000 and 1,180,000. Two hundred thousand more people will need water! Today the average rate of use in the five principal Rhode Island cities is 130 gallons per day per person. By the time our children grow up it will be even higher!

"Let's do something about it—like getting water out of the ocean."
Desalting ocean or brackish water is economically feasible only when there's no less expensive way to get fresh water—in desert places, for instance—and if one can pay the price! Desalinized water production costs are as much as 15 times those of Providence production costs. Mr. Holton, Chief Engineer of the Providence Water Supply Board, recently estimated an industrialist's annual water bill of $47,000 would cost $617,000 if it had involved desalinized water. Not many industries would stay in Rhode Island—let alone come here!—at that price.

"Let's use our underground water supplies."
Rhode Island has important ground-water supplies. Our geological surveys of these supplies are extensive. However, experience has demonstrated that large demands for water supply are best—and most economically—served by surface reservoirs. Ground water adequately fills smaller needs. We need both.

"Then what do we do?"
Fortunately, in Rhode Island we still have a few untapped sources for large quantities of good, clean pure water. But a delay in acquiring the necessary reservoir areas can be costly. Already the delay since the 1960 proposal has added more than half a million dollars to the cost of acquisition! This increase will accelerate rapidly in the near future because of large industrial and residential development in these areas.

This is what the Water Reservoir Bond Issue is all about. It enables Rhode Islanders to act now for their future needs.

A well-known, respected, independent engineering firm has found these sites perfect for our purposes. Wood River forms an ideal catchment area; Big River an ideal catchment and storage basin. Used together they will yield more than 60 million gallons per day.

Until construction, the entire area will be under the jurisdiction of an agency appointed by the Governor—possibly Parks and Recreation. Reservoir development takes years from planning to realization. Recreation now, water supply later when needed. This is true conservation of natural resources.

"But the sites are too far away!"
No! Acquisition of the Big River-Wood River sites will benefit communities throughout the State—even towns across Narragansett Bay. Way back in 1915 a few far-sighted people saw that Providence would eventually need the Scituate reservoir system. Even after 40 years that system is providing fine water to more than half the people of the state. By 1980 more reservoir area will be needed. Big River and Wood River will satisfy this statewide need!

DID YOU KNOW THAT

In the average home with running water we use water in the following amounts.

We use 5 gallons daily to wash, shave and brush our teeth.

Every minute a shower runs, 5 gallons are used.

Every flush of the toilet requires 5 to 7 gallons.

A load of laundry can use as much as 55 to 60 gallons of water for all 3 cycles—suds and 2 rinses.

Automatic lawn sprinklers use as much as 400 gallons per hour. Air conditioners, swimming pools, garbage disposals and automatic dishwashers put a heavy demand on the water supply.

It is expected that the population of Rhode Island will climb between 21.8% and 37.1% by 1980.

Yet we are already short of adequate water supply in many parts of Rhode Island!

We need to act now for an ample supply of good, pure water for the future.

IT'S YOUR WATER RESERVOIR BOND ISSUE

APPROVE ☐

REJECT ☐

Big River-Wood River Reservoir Site Acquisition State Bonds not exceeding $5,000,000

(Chapter 133—Public laws of 1964)

"Shall the action of the general assembly, by an act passed at the January session, 1964, the short title of which is the 'Big River-Wood River reservoir site acquisition act,' granting authority for the issuance of bonds and temporary notes of the State in an amount not to exceed five million dollars ($5,000,000), to finance the acquisition by the State of sites for the Big River-Wood River reservoirs and distribution facilities related thereto be approved and the issuance of bonds and temporary notes authorized in accordance with the provisions of said act?"

Rhode Island Water Resources Board

Big River Reservoir: History

- **1970s:** Two GO bond referenda rejected by Voters: 53% - 47% & 85% - 42%
- **1980:** GO bond referendum: **Approved** by Voters:
  - Reservoir Design: $5.23M
  - 60% - 40%
- **1984:** Design 20% Complete
- **1986:** GO bond referendum: **Approved** by Voters:
  - Plans, Studies & Permitting: $1.6M
  - 63% - 37%

Rhode Island Water Resources Board

Big River Reservoir: History

- **1989:** Water Coordinating Council Established
  - Initiates Statewide Water Study by A.D. Little
- **1989:** Governor DiPrete initiates Big River groundwater well development planning as a interim water supply source
- **1990:** EPA Questions Need for Big River Project
- **1990:** Statewide Water Study by A.D. Little Published

Rhode Island Water Resources Board

Big River Reservoir: Estimated Costs

Year	Estimated Cost	Source
1967	$19,500,000	M&E Report To WRCB: 3/15/1967
1968	$30,000,000	WRB Report to Legislature: 2/1986
1977	$44,834,000	Keyes Assoc. Letter to WRB: 6/21/1977
1980	$100,300,000	Touche Ross Report: 5/10/1986
1984	$135,000,000	Touche Ross Report: 5/10/1986
1984	$157,444,000	KA/ME projection 11/1984
1985	$203,100,000	Touche Ross Report: 5/10/1986
1989	$281,796,000	KA/ME 80% Design Completion Estimate: 1/9/1989

Rhode Island Water Resources Board
Big River Reservoir: Estimated Costs

Year	Estimated Cost	Basis
2006	~$549,000,000	1989 KA/ME Estimate + 4% per year
2012	~$750,000,000	Permitting, Design & Land Takings completed; Ready to Solicit Bids; 2006 + 4% per year + Additional Design Costs (8%)
2019	~$990,000,000	Seven years for construction; Final cost = 2012 + 4% per year
2022	~$1,110,000,000	Three years to fill Reservoir; Costs added to pay Interest on borrowings; Water sales begin

Rhode Island Water Resources Board

Big River Reservoir

Artist Concept Based on 1989 Design

(Looking to the South)

Rhode Island Water Resources Board

Big River Reservoir: Economic Impacts

27 MGD	Average Daily Sales of Water
~$80,000,000	Annual P&I Payments @ 5.15% for 30 years
~$800 – 1,000 per year	Cost to "Typical" Residential User: Does NOT include • O&M, treatment or transmission costs • Debt Coverage Reserve Assumes the sale of 27 mgd of water every year

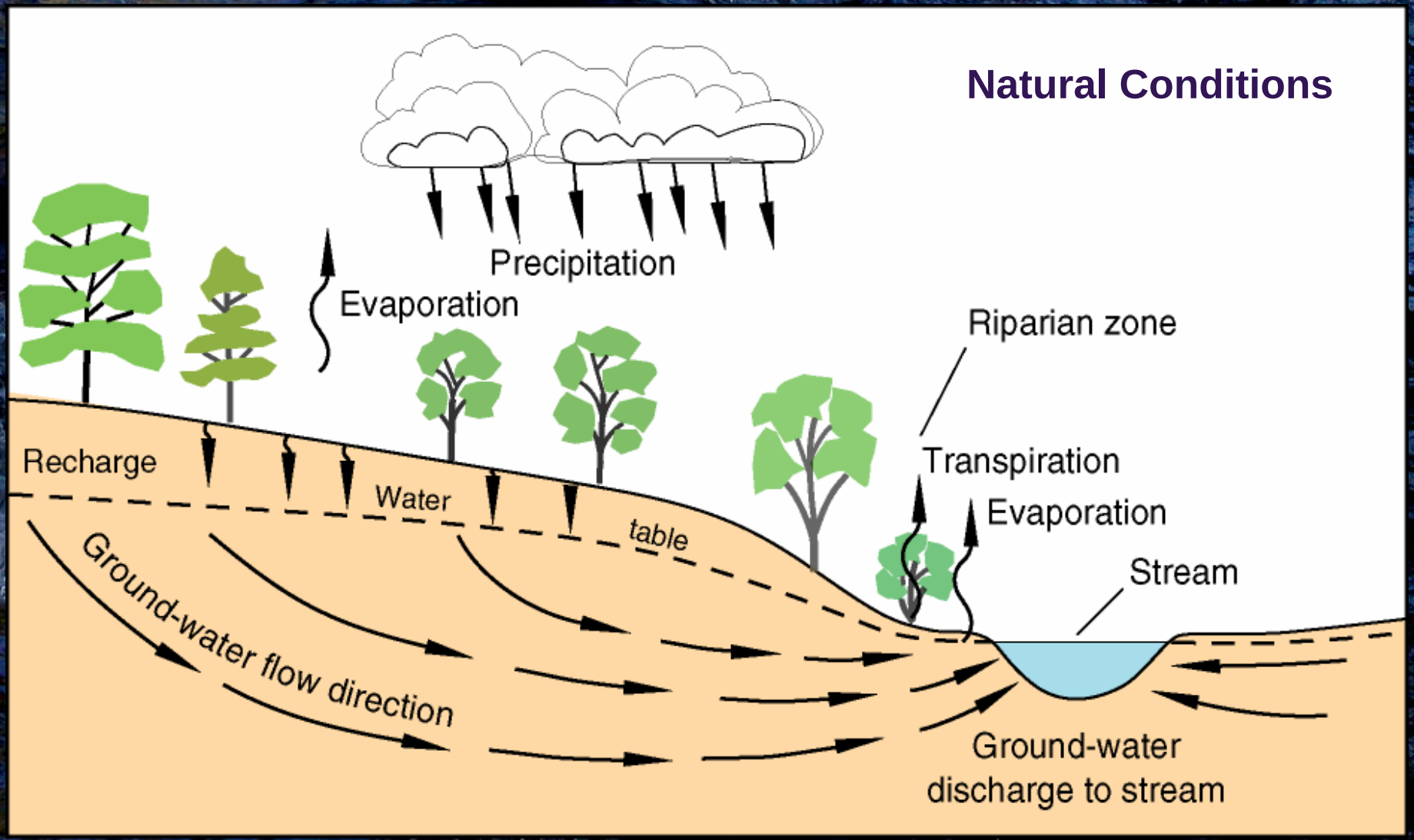
Rhode Island Water Resources Board
Big River Management Area
Open Space Legislation

- **1993** RIGL 45-36-1 BRMA “Open Space”
- RIGL 45-36-1: “Open Space” - “any space the preservation or restriction of the use of which would … Protect natural streams or water supply”
- **1996** RIWRB adopts Policies for public use of the BRMA lands to protect the future use of these lands as a water supply source
- **2006** Policies and Plan being studied and updated

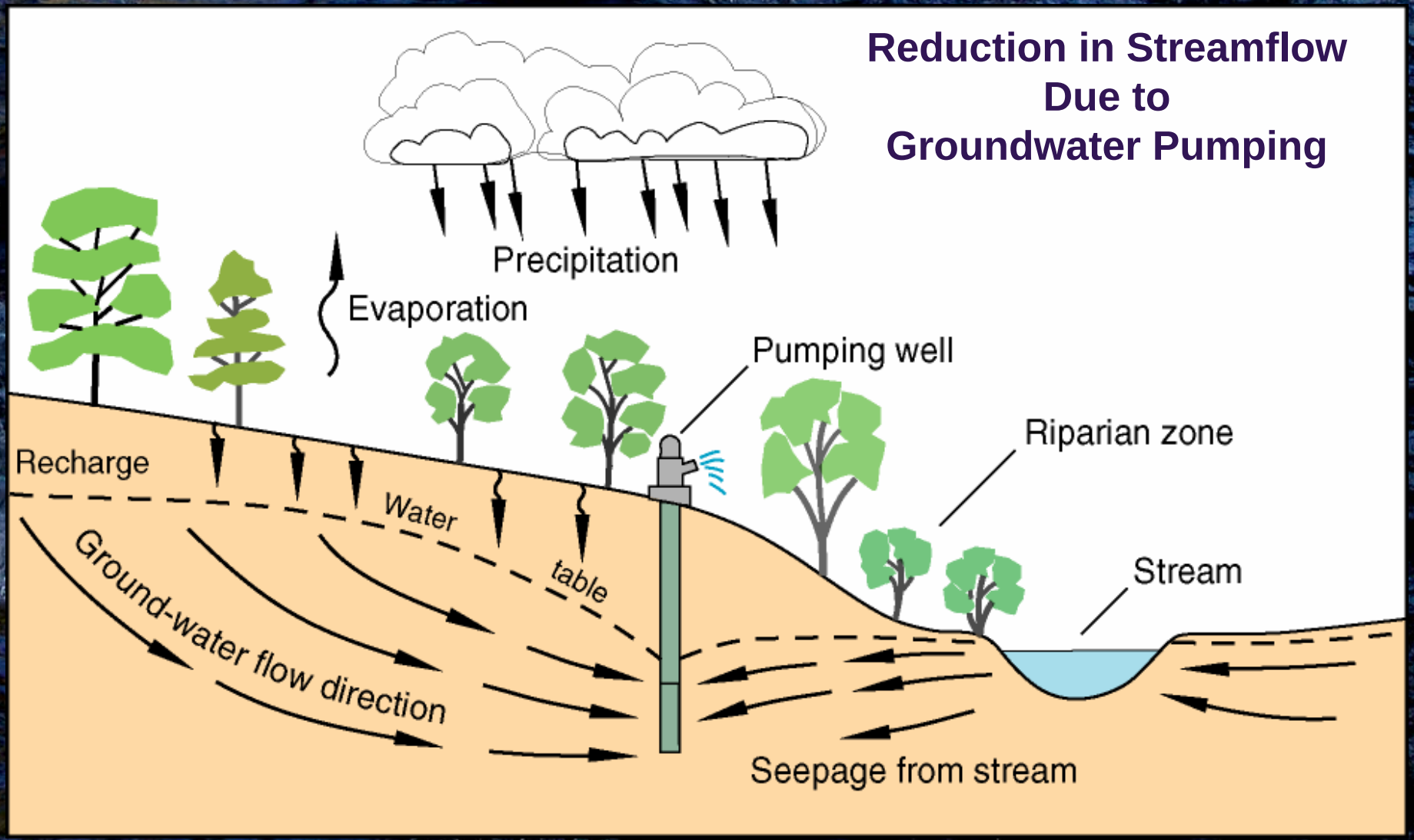
Rhode Island Water Resources Board

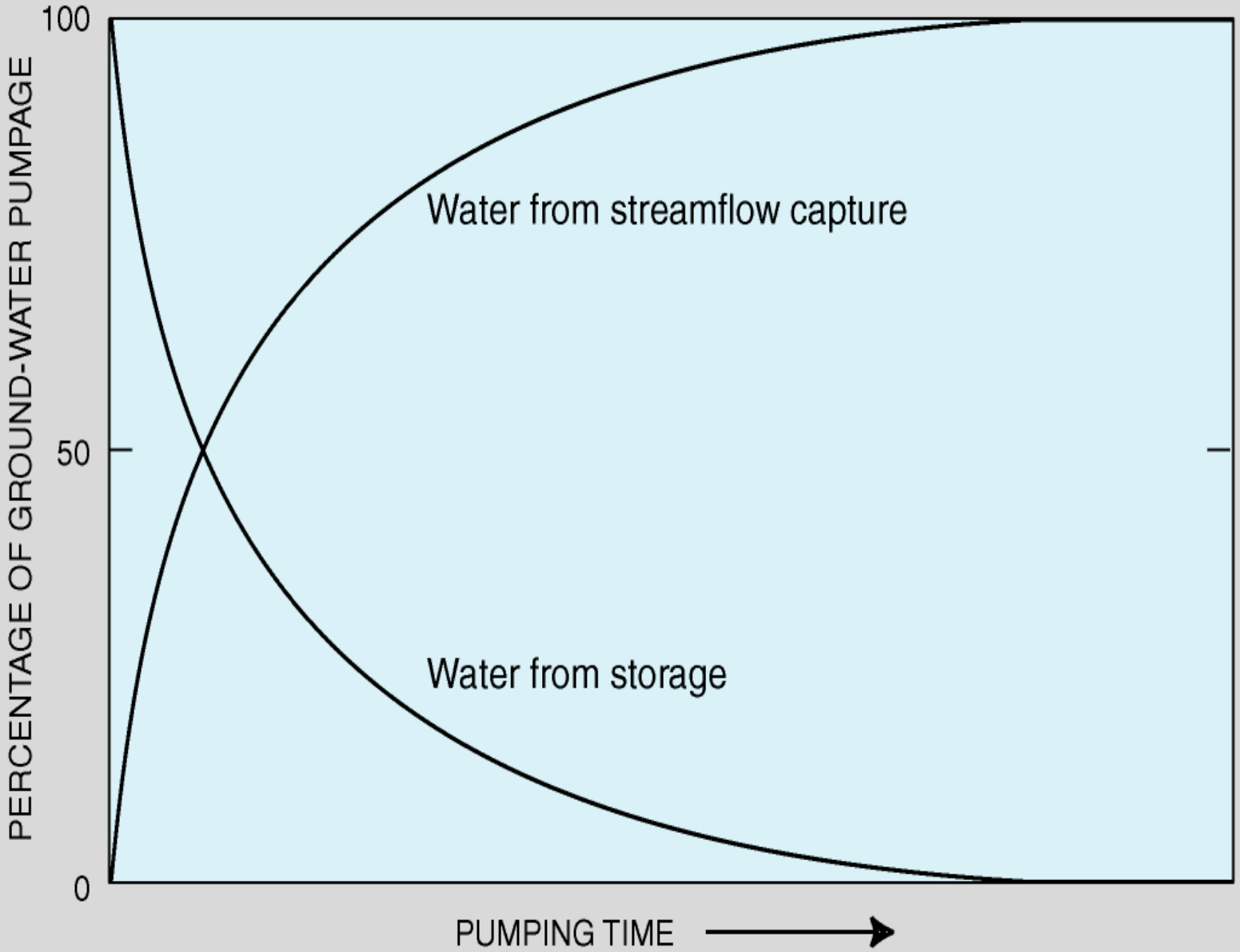
Big River Groundwater Studies

Natural Conditions



Reduction in Streamflow Due to Groundwater Pumping




100
50
0
PERCENTAGE OF GROUND-WATER PUMPAGE
Water from streamflow capture
Water from storage
PUMPING TIME


Rhode Island Water Resources Board
Big River
Groundwater Development

Rhode Island Water Resources Board
USGS Studies

- **1996: RIWRB establishes cooperative agreement with USGS**
- **Groundwater well development studies initiated**
  - **1996 - 1998 Data collection**
  - **Since 1996 four major studies completed**
  - **defines the BRMA water supply capabilities**

USGS
science for a changing world

Hydrogeologic Data for the Big River–Mishnock River Stream-Aquifer System, Central Rhode Island

U.S. Department of the Interior
U.S. Geological Survey

2001

USGS
science for a changing world

Prepared in cooperation with the
RHODE ISLAND WATER RESOURCES BOARD

Hydrogeologic Data for the Big River–Mishnock River Stream-Aquifer System, Central Rhode Island

- Data affecting groundwater development
- Groundwater and surface water levels
- Subsurface conditions
- Stream discharge measurements
- Ground water quality data measurements

USGS
science for a changing world

Hydrogeologic Data for the Big River–Mishnock River Stream-Aquifer System, Central Rhode Island

U.S. Department of the Interior
U.S. Geological Survey

Glacial Geology and Aquifer Characteristics of the Big River Area, Central Rhode Island

By JANET RADWAY STONE and DAVID C. DICKERMAN

Prepared in cooperation with the
RHODE ISLAND WATER RESOURCES BOARD

USGS
science for a changing world

2002

U.S. Department of the Interior
U.S. Geological Survey

Glacial Geology and Aquifer Characteristics of the Big River Area, Central Rhode Island

Stone and Dickerman — GLACIAL GEOLOGY

- Initial results on the aquifer system based on geologic and geophysical field studies
- Information to protect, develop and manage the Big River stream aquifer system
- The Big River network of rivers, brooks and lakes and ponds are in hydraulic connection with the aquifer

USGS
science for a changing world

Hydrogeologic Data for the Big River–Mishnock River Stream-Aquifer System, Central Rhode Island

U.S. Department of the Interior
U.S. Geological Survey

Glacial Geology and Aquifer Characteristics of the Big River Area, Central Rhode Island

By JANET RADWAY STONE and DAVID C. DICKERMAN

Water-Resources Investigations Report 91-4166

Prepared in cooperation with the
RHODE ISLAND WATER RESOURCES BOARD

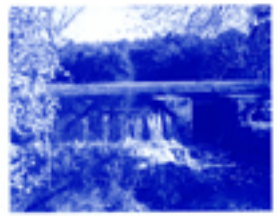
USGS
science for a changing world

USGS
science for a changing world

In cooperation with the
RHODE ISLAND WATER RESOURCES BOARD

Hydrogeology and Simulated Effects of Ground-Water Withdrawals in the Big River Area, Rhode Island

Water-Resources Investigations Report 93-4037



U.S. Department of the Interior
U.S. Geological Survey

USGS
science for a changing world

2003

In cooperation with the
RHODE ISLAND WATER RESOURCES BOARD

Hydrogeology and Simulated Effects of Ground-Water Withdrawals in the Big River Area, Rhode Island

- Provides the hydrology of the area
- Defined Numerical Simulation Models
- Potential effects of different withdrawal scenarios
- The three basins in the area (Big, Mishnock and Carr) are one single ground water resource
- The Carr Basin naturally loses water to the Mishnock

USGS
science for a changing world

Hydrogeologic Data for the Big River–Mishnock River Stream-Aquifer System, Central Rhode Island

U.S. Department of the Interior
U.S. Geological Survey

Glacial Geology and Aquifer Characteristics of the Big River Area, Central Rhode Island

By JANET RADWAY STONE and DAVID C. DICKERMAN

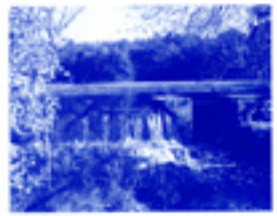
Prepared in cooperation with the
RHODE ISLAND WATER RESOURCES BOARD

USGS
science for a changing world

USGS
science for a changing world

In cooperation with the
RHODE ISLAND WATER RESOURCES BOARD

Hydrogeology and Simulated Effects of Ground-Water Withdrawals in the Big River Area, Rhode Island



U.S. Department of the Interior
U.S. Geological Survey

USGS
science for a changing world

In cooperation with the
Rhode Island Water Resources Board

Effects of Alternative Instream-Flow Criteria and Water-Supply Demands on Ground-Water Development Options in the Big River Area, Rhode Island

U.S. Department of the Interior
U.S. Geological Survey

USGS
science for a changing world

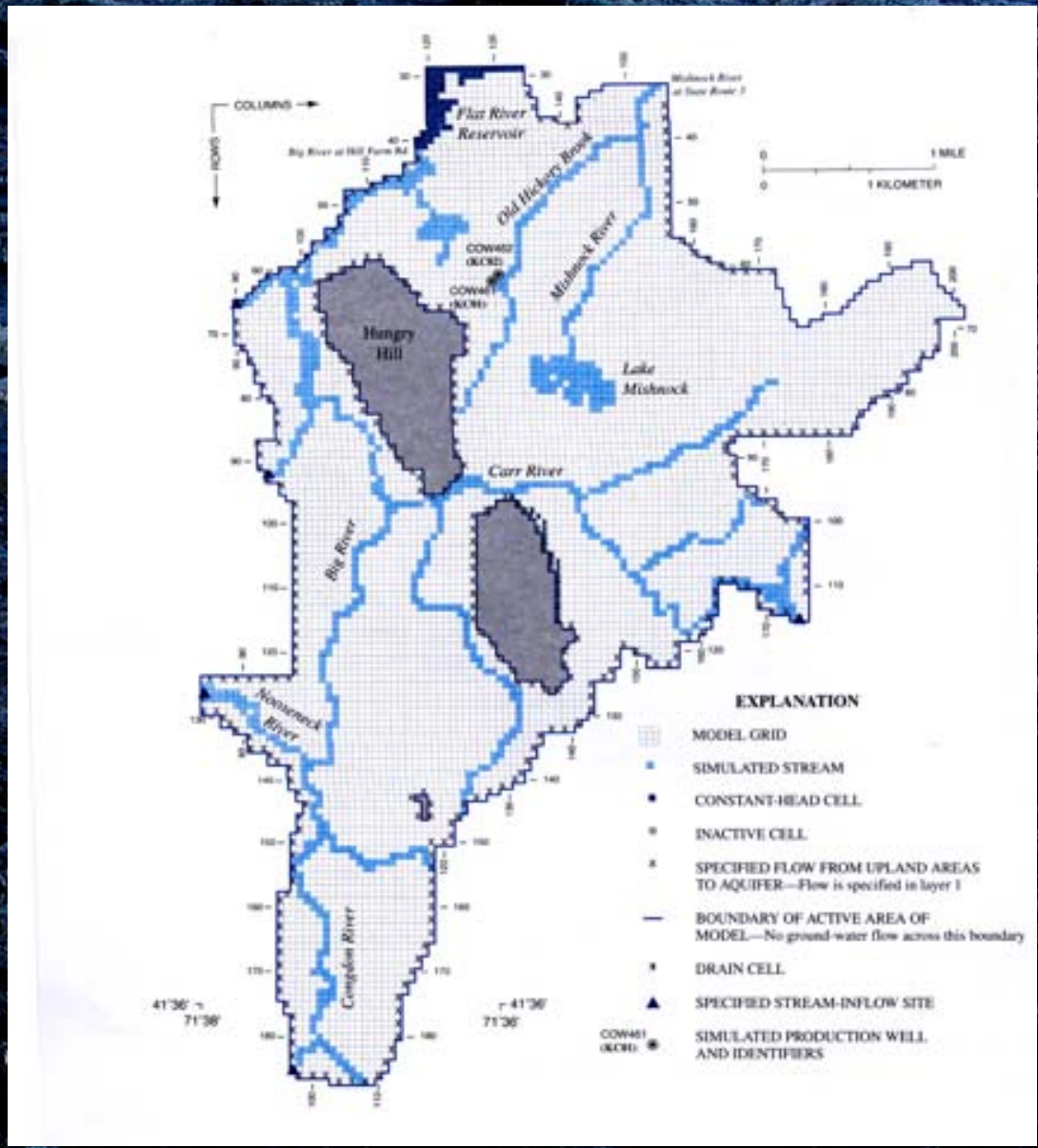
2004

In cooperation with the
Rhode Island Water Resources Board

Effects of Alternative Instream-Flow Criteria and Water-Supply Demands on Ground-Water Development Options in the Big River Area, Rhode Island

- Ground water flow simulation and optimization techniques were used to evaluate potential effects of instream-flow criteria and water supply demands
- Determined the amount of ground water that could be withdrawn from the three basins when constrained by streamflow requirements

Groundwater Simulation Models

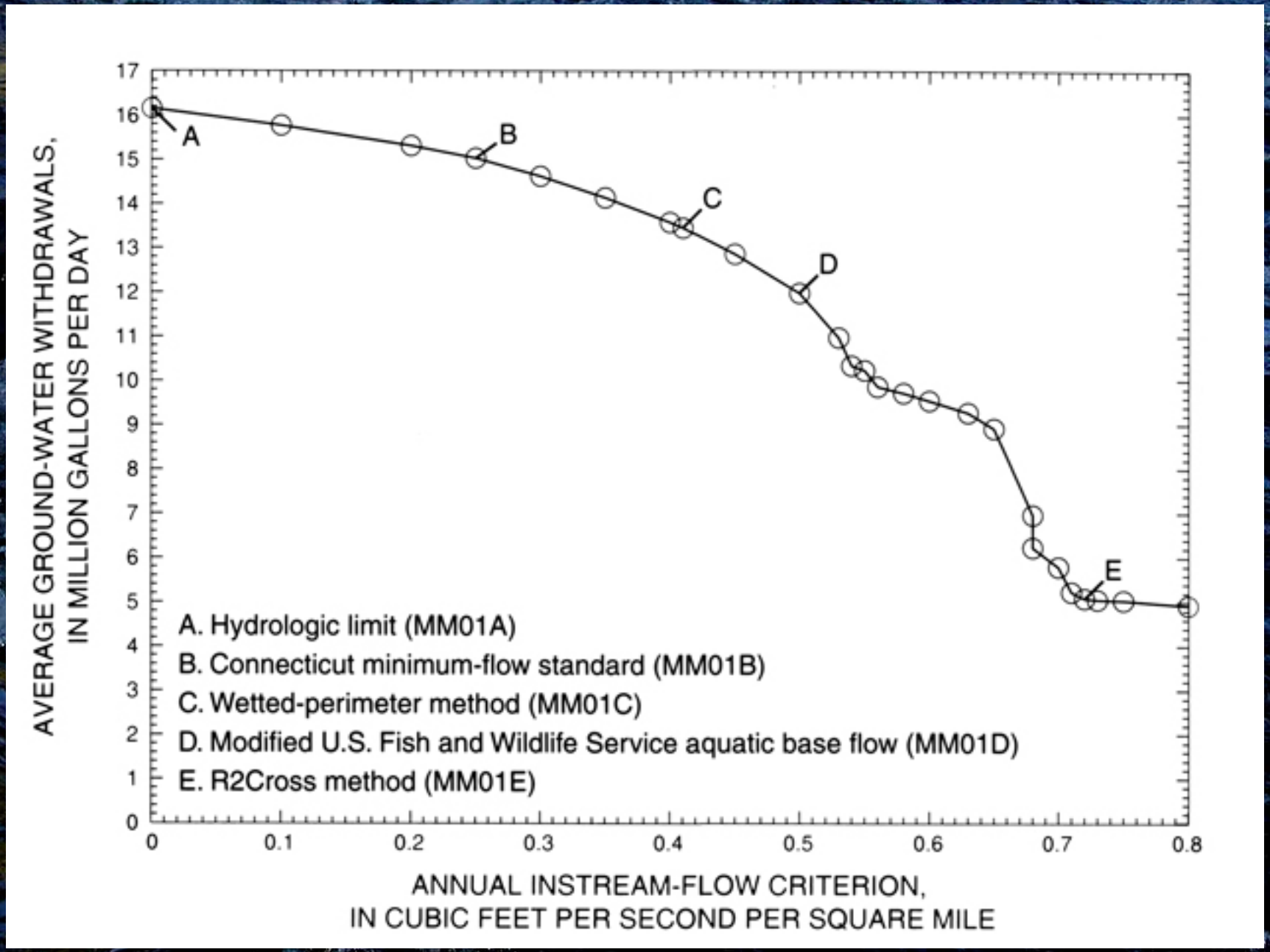


Rhode Island Water Resources Board
Big River Groundwater Wells:
Well Evaluations

- **13 Wells Evaluated**
  - **4 KCWA Mishnock Area**
  - **3 Carr River Area**
  - **6 Big River Area**
    - **(3 hypothetical)**

Rhode Island Water Resources Board
Big River Groundwater Wells:
Possible Water Production

- **31 Simulations Evaluated**
  - Each with different streamflow criteria
- **Hydraulic Limit = 16 mgd for all 13 wells**
  - Pumping at this rate = no flow in streams


AVERAGE GROUND-WATER WITHDRAWALS, IN MILLION GALLONS PER DAY
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
A
B
C
D
E
A. Hydrologic limit (MM01A)
B. Connecticut minimum-flow standard (MM01B)
C. Wetted-perimeter method (MM01C)
D. Modified U.S. Fish and Wildlife Service aquatic base flow (MM01D)
E. R2Cross method (MM01E)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
ANNUAL INSTREAM-FLOW CRITERION,
IN CUBIC FEET PER SECOND PER SQUARE MILE

Rhode Island Water Resources Board
Big River Groundwater Wells:
Possible Water Production

- **Possible Maximum Withdrawals:**
  - **Big River Area Only**
    - **5 – 7 mgd (annual average daily basis)**
    - **2 – 4 mgd (late summer average daily basis)**
    - **> 4 mgd possible if wells are pumped only in the summer months (average summer day basis)**

Rhode Island Water Resources Board
Big River Groundwater Wells: Capital Costs

	Scenario I: Treatment	Scenario II: NO Treatment
Phase I	$18.65 M	$15.38 M
Phase II	$12.45 M	$8.83 M
Total	$31.10 M	$24.21 M

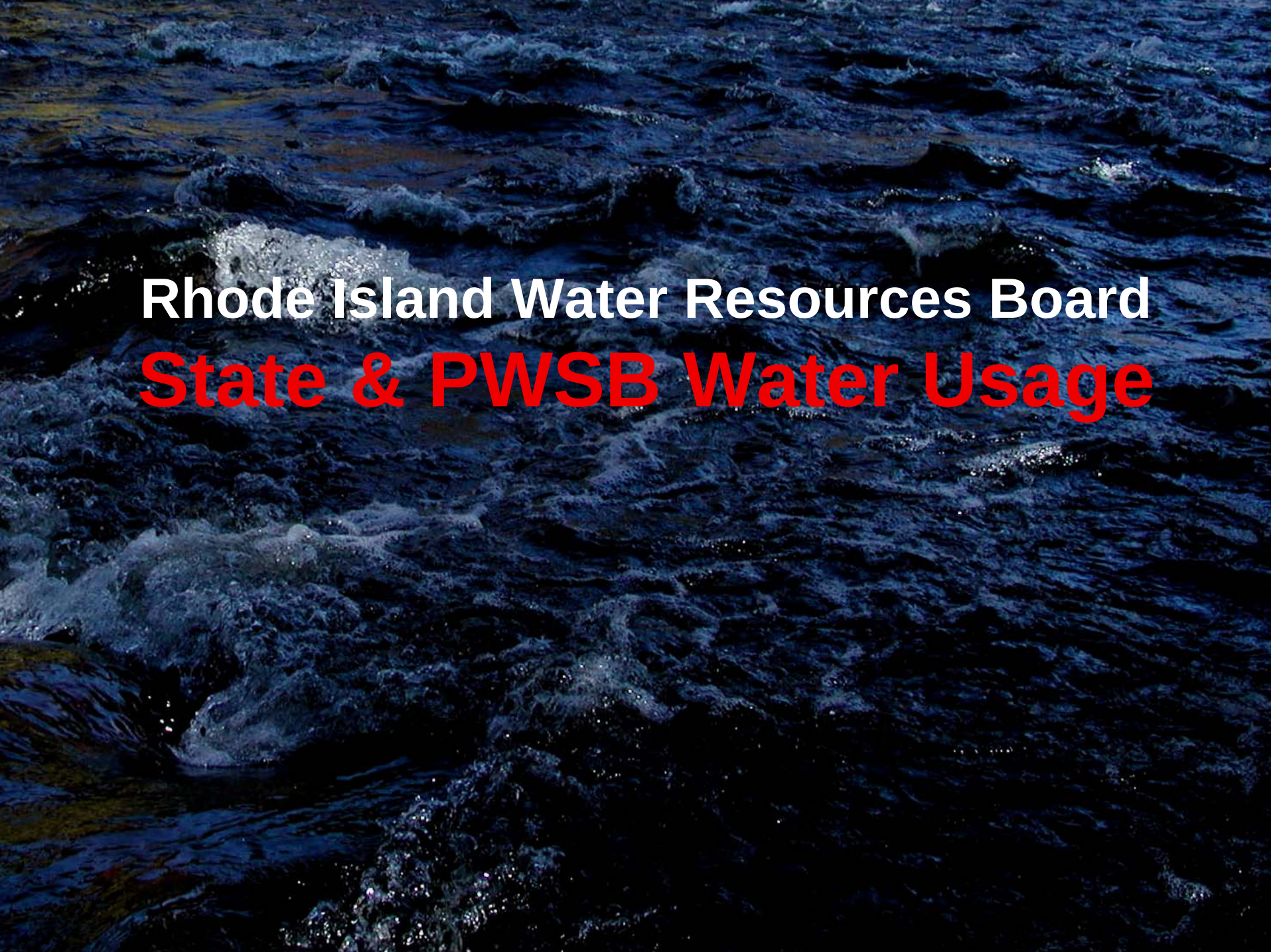
- M - All Costs in Millions of Dollars
- Preliminary Capital Costs based on 1999 conceptual design including wells, transmission lines, pumping facilities and treatment facility (in Scenario I)
- Preliminary Capital Cost Estimates based on 1999 RIWRB Business Plan

Rhode Island Water Resources Board

Big River Groundwater Wells: Schedule

Highly Dependent on Resources Available

Task	Time of Completion
Update Engineering & Financial Plans	12 months
Environ. Studies, Prel. Engr., Permitting, Review, Approval	24 - 30 months
Final Design	12 months
Construction	24 - 30 months


Rhode Island Water Resources Board
State & PWSB Water Usage

Rhode Island Water Resources Board
Statewide Water Usage Overview

- **Rhode Island Public Water Supply**
  - Serves 88% of State Population
  - 119.21 mgd
- **28 “Major” Water Suppliers + Richmond + Block Island**
  - Provide 98% of all Publicly-Supplied Water
  - 116.83 mgd
- **~450 “Small” Public Systems**
  - Provide 2% of all Water Used
  - 2.38 mgd
  - 15 Or More Service Connections

Rhode Island Water Resources Board
Statewide Water Usage Summary

Water Use Type	Water Use MGD	Percent of Total Usage
Domestic, Industrial & Irrigation:	136 MGD	32%
Thermoelectric Power Production	293 MGD	68 %
Total Statewide Water Usage	492 MGD	100%

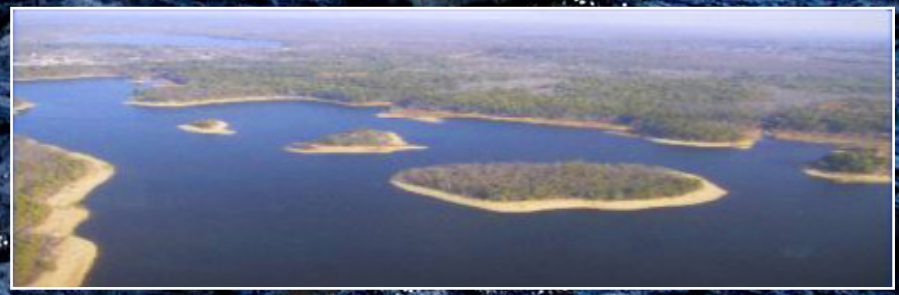
Above data reflects Average Annual Daily Usage

Rhode Island Water Resources Board
PWSB Water Usage Summary

- **PWSB Scituate System Serves:**
  - Nearly 70% of State Population
  - 9 Public Water Systems + Providence System
  - 14 Communities
  - Legislatively Authorized to Provide Water to Additional Communities
- **Average Demand FY 2005: 69.3 mgd**
  - Wholesale Customers
  - Retail Customers

Supplier	2005 Wholesale Purchases (mgd)
Bristol County Water Authority	3.70
East Providence Public Works	4.95
East Smithfield Water District	0.71
Greenville Water District	0.96
Johnston Water Control Division	0.37
Kent County Water Authority	8.02
Lincoln Water Commission	2.27
Smithfield Water Supply Board	0.89
Warwick	8.84

PWSB Scituate System



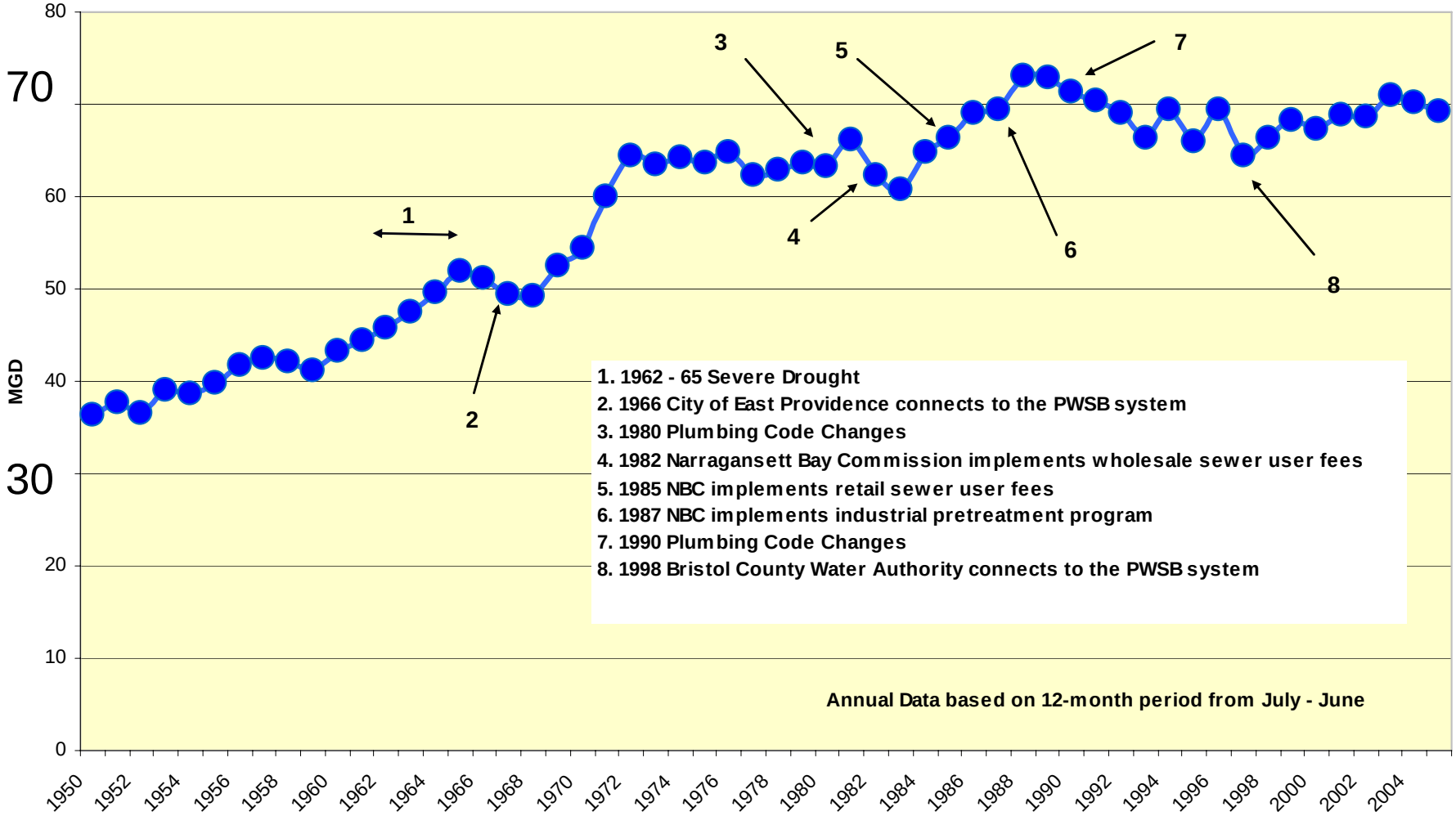
2005
Average Day Demand
69.3 mgd

Maximum Day Demand
119.1 mgd

Rhode Island Water Resources Board

PWSB Scituate Reservoir

Average Daily Demand, MGD: 1950 - 2004



Report:

Presented to:

Rhode Island Water Resources Board \
Providence Water Supply Board

Supplemental Water Supply Feasibility Study

Presented by:

Maguire Group, Inc.
Architects/Engineers/Planners
225 Chapman Street
Providence, R.I. 02905

Rhode Island Water Resources Board
Daily Demand: Average Vs. Maximum

Water Supplier	Average Day, mgd	Maximum Day, mgd
Cumberland	2.44	5.18
Narragansett	1.23	2.59
Newport	7.80	12.48
North Kingstown	3.90	6.60
North Tiverton	0.37	0.50
Pawtucket	13.05	21.16
Portsmouth	1.12	2.34
South Kingstown	0.40	1.02
Stone Bridge	0.51	0.98
United Water	2.75	4.87

Rhode Island Water Resources Board
Average, Maximum & Capacity

Statewide (All Major Public Systems)

- **Average: 116.66 mgd**
- **Maximum: 201.63 mgd**
- **Capacity: 229.80 mgd**


Rhode Island Water Resources Board
Kent County Water Authority

Rhode Island Water Resources Board

Kent County Water Authority Issues

- **Present Supplies**
  - **Mishnock Groundwater wells**
  - **Hunt River wells**
  - **Providence Water Supply Board**

Continued ...

Rhode Island Water Resources Board
Kent County Water Authority Issues

- Three connections to the PWSB
  - Cranston: Oaklawn Avenue
  - Scituate: Clinton Avenue Pumping Station
  - Warwick: Bald Hill Road Pumping Station (Warwick water from PWSB)

Rhode Island Water Resources Board
Kent County Water Authority Issues

- **KCWA System Demand**
  - Average Daily Demand: 10.46 mgd
  - Maximum Daily Demand: 19.84 mg

Water Source	Present Usage (% of Total)
Mishnock Wells	0%
Hunt River Wells	~10%
Providence Water	>80%

Rhode Island Water Resources Board
Kent County Water Authority Issues

Hunt River Aquifer: August Withdrawals

Water Supplier	Hunt River Withdrawals
Quonset Dev. Corp.	~0.80 mgd (2004)
North Kingstown	~6.60 mgd (2005)
KCWA	~1.11 mgd (2005)
Total	~8.51 mgd

Does not include industrial and fish hatchery withdrawals

Withdrawals above 8.00 mgd may be a streamflow issue


Rhode Island Water Resources Board
Another Alternative

Rhode Island Water Resources Board
Local Desalination Project

- **Brockton, MA Project**
  - 10 years in discussion and planning
  - Facility to be located in Dighton, MA
  - On Taunton River
  - Will supply 15 -20% of Brockton water
  - 10 mgd facility
  - $60 Million


Rhode Island Water Resources Board
Priorities

Rhode Island Water Resources Board
Priorities

- **Development of Water Management System**
  - **Provide Water Data to Cities & Towns**
  - **Relate new Land Development Projects to Water Availability**
  - **Amend State Land Use Plan to include Water Related Factors**

Continued ...

LAND USE 2025

Rhode Island State Land Use Polices and Plan

State Guide Plan Element 152

Where Are We Going?

Figure 121-01 (1)

Developed and Protected Lands

Map Legend

- RI Town Boundaries
- Existing Development (1995)
- Protected Lands(2005) / Urban Par
- Open Water

White Areas = Undeveloped / Unprotected Lands

1995

Block Island

Figure 121-01 (2)

Current Trend

Scenario Legend

- RI Town
- Existing Development (1995)
- Potential Development by 2025
- Protected Lands(2005) / Urban Parks
- Open Water

White Areas = Undeveloped / Unprotected Lands

2025?

Block Island

NOTE: The "Current Trend" Scenario presents a geographic analysis indicating what Rhode Island's overall land use pattern could be in 2025 based upon projections of population, household, and employment growth, and a continuation of the development patterns of recent decades, based upon current laws and local ordinances; but is a representation of only one of many possible outcomes.

The information depicted on this map is suitable for planning purposes only. It may not be adequate for legal boundary definition or regulatory interpretation.

Rhode Island Water Resources Board
Priorities

- **Big River Management Area**
  - Establish Variable & Sustainable Level for Withdrawal of Groundwater in the BRMA
  - Determine Who & How to Develop BRMA groundwater
  - Reduce/Eliminate Trash Dumping at BRMA
- **Long-Term Funding for Streamflow Gages**

Continued ...

Rhode Island Water Resources Board
Priorities

- **Reduce Excessive Residential Water Use**
  - **Objective 65 gpcd**
  - **Manage and Reduce Peak Usage**
- **Implement Water/Wastewater Reuse & Recycle Programs**
- **Implement Consolidation/ Regionalization of Existing Small Water Systems**
- **Implement Collaborative Water Education Program**

Continued ...

Rhode Island Water Resources Board
Priorities

- Address Interstate Transfer of Water
  - Examples:
    - Bristol County Water Authority (MA)
    - Pawtucket Water Supply Board (MA)
    - Eleanor Slater Hospital: Wallum Lake (MA)
    - Westerly Water Department (CT)
- Global Climate Change

Rhode Island Water Resources Board

Next Steps … ?

- Change the Way We Manage Water
- Can’t Assume Water will be Available
- Treat Water as the Priority Issue for the State
- Address/Modify Residential Use Patterns
- Support Land Use Planning Changes
- Institute Reuse & Recycling
- Implement Statewide Water Awareness Programs
- Implement RIWRB Priorities


WATER RESOURCES BOARD
STATE OF RHODE ISLAND
HOPE